REMARKS

This amendment responds to the office action mailed June 10, 2003. In the office action the Examiner:

- rejected claims 1, 11-16, 19-20 and 34 under 35 U.S.C. 102(b) as anticipated by Tatsumi et al. (U.S. Patent No. 4,634,490);
- rejected claims 4 and 35 under 35 U.S.C. 103(a) as being unpatentable over Tatsumi et al. (U.S. Patent No. 4,634,490) as applied to claim 1 above, and further in view of Fink et al.(U.S. Patent No. 5,359,640);
- rejected claims 5-6, 32-33 and 36-38 under 35 U.S.C. 103(a) as being unpatentable over Tatsumi et al. (U.S. Patent No. 4,634,490) as applied to claim 1 above, and further in view of Stettner et al. (U.S. Patent No. 5,629,524);
- rejected claim 8 under 35 U.S.C. 103(a) as being unpatentable over Tatsumi et al. (U.S. Patent No. 4,634,490) as applied to claim 1 above, and further in view of Cullity;
- rejected claim 9 under 35 U.S.C. 103(1) as being unpatentable over Tatsumi et al. (U.S. Patent No. 4,634,490) as applied to claim 1 above, and further in view of Dosho (U.S. Patent No. 6,285,736);
- rejected claim 10 under 35 U.S.C. 103(a) as being unpatentable over Tatsumi et al. (U.S. Patent No. 4,634,490) as applied to claim 1 above, and further in view of Polichar et al. (U.S. Patent No. 6,205,199 B1);
- rejected claims 17 and 18 under 35 U.S.C. 103(a) as being unpatentable over Tatsumi et al. (U.S. Patent No. 4,634,490) as applied to claim 16 above;
- rejected claim 21 under 35 U.S.C. 103(a) as being unpatentable over Tatsumi et al. (U.S. Patent No. 4,634,490) as applied to claim 20 above;
- rejected claim 22 under 35 U.S.C. 103(a) as being unpatentable over Tatsumi et al. (U.S. Patent No. 4,634,490) as applied to claim 1 above, and further in view of Arnowitz et al. (U.S. Patent No. 6,468,346 B2);
- rejected claims 23 and 24 under 35 U.S.C. 103(a) as being unpatentable over Tatsumi et al. (U.S. Patent No. 4,634,490) as applied to claim 1 above;
- rejected claim 4 under 35 U.S.C. 103(a) as being unpatentable over Murayama (U.S. Patent No. 5,046,077) as applied to claim 1 above, and further in view of Fink et al. (U.S. patent No. 5,359,640);

- rejected claims 5-6 under 35 U.S.C. 103(a) as being unpatentable over Murayama (U.S. Patent No. 5,046,077) as applied to claim 1 above, and further in view of Stettner et al. (U.S. Patent No. 5,629,524;
- rejected claim 8 under 35 U.S.C. 103(a) as being unpatentable over Murayama (U.S. Patent No. 5,046,077) as applied to claim 1 above, and further in view of Cullity;
- rejected claim 9 under 35 U.S.C. 103(a) as being unpatentable over Murayama (U.S. Patent No. 5,046,077) as applied to claim 1 above, and further in view of Dosho (U.S. Patent No. 6,285,736 B1);
- rejected claim 10 under 35 U.S.C. 103(a) as being unpatentable over Murayama (U.S. Patent No. 5,046,077) as applied to claim 1 above, and further in view of Polichar et al. (U.S. Patent no. 6,205,199 B1);
- rejected claims 17 and 18 under 35 U.S.C. 103(a) as being unpatentable over Murayama (U.S. Patent No. 5,046,077) as applied to claim 16 above;
- rejected claim 21 under 35 U.S.C. 103(a) as being unpatentable over Murayama (U.S. Patent No. 5,046,077) as applied to claim 20 above;
- rejected claim 22 under 35 U.S.C. 103(a) as being unpatentable over Murayama (U.S. Patent No. 5,046,077) as applied to claim 1 above, and further in view of Arnowitz et al. (U.S. Patent No. 6,468,346 B2);
- rejected claim 28 under 35 U.S.C. 103(a) as being unpatentable over Murayama (U.S. Patent No. 5,046,077) as applied to claim 25 above, and further in view of Fink et al. (U.S. Patent No. 5,359,640);
- rejected claim 29 under 35 U.S.C. 103(a) as being unpatentable over Murayama (U.S. Patent No. 5,046,077) as applied to claim 25 above, and further in view of Arnowitz et al. (U.S. Patent No. 6,468,346 B2); and
- rejected claims 30 and 31 under 35 U.S.C. 103(a) as being unpatentable over Murayama (U.S. Patent No. 5,046,077) as applied to claim 25 above.

After entry of this amendment, the pending claims are: claims 1-42.

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Claim Objections

The Examiner has objected to claims 1, 11, 25 and 34 as indefinite, as the phrase "suitable" renders the claim(s) indefinite. Claims 1, 11, 25, and 34 have been amended to address the Examiners concerns. The Examiner further states that "can be identified" in line 12 should be changed to "is identified." Claim 1 has been amended to address this concern. Accordingly, these objections are now moot.

Claim Rejections – 35 USC § 102

The Examiner has rejected claims 1, 11-16, 19-20 and 34 under 35 U.S.C. 102(b) as being anticipated by Tatsumi et al. (US 4634490).

It is well established law that for a prior art reference to anticipate a claim, each and every element of the claim must be identically shown in a single reference.[1]

This set of rejected claims contains three independent claims, namely independent claims 1, 11, and 34.

Independent claim 1 now includes the limitations of multiple crystal growth environments and a positioner, neither of which are taught by Tatsumi. In other words, Tatsumi teaches irradiating a single crystal during growth, but does not disclose multiple crystal growth environments or a positioner that positions an X-ray system and each of the crystal growing incubators relative to one another.

Likewise, independent claim 11 requires multiple *in-situ* growth environments, as well as aligning the crystalline material and a X-ray system with one another. This alignment is performed for each *in-situ* growth environment having crystalline material previously identified. Tatsumi teaches irradiating a single crystal during growth, but does not disclose multiple *in-situ* growth environments or aligning the crystalline material and a X-ray system for each *in-situ* growth environment.

Similarly, independent claim 34 requires an array of crystal growth environments and a positioner configured to sequentially align each of said crystal growth environments and said X-ray system with one another. Again, Tatsumi discloses no such array of crystal growth environments or positioner.

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[1] *See In re Bond*, 910 F.2d 831 (Fed. Cir. 1990).

In light of the above, it is respectfully submitted that th amended independent claims 1, 11, and 34, as well as their dependent claims 12-16, and 19-20, cannot be anticipated by Tatsumi, as Tatsumi does not identically show every element of these claims. Accordingly, it is respectfully submitted that claims 1, 11-16, 19-20 and 34 are now in condition for allowance.

Claim Rejections - 35 USC § 103

The Examiner has rejected claims 4 and 35 under 35 U. S.C. 103(a) as being unpatentable over Tatsumi el al. (U.S. Patent No. 4,634,490) as applied to claim 1 above, and further in view of Fink el al. (U. S. Patent No. 5 3 59,640).

To establish a prima facie case of obviousness, the prior art reference (or references when combined) must teach or suggest all the claim limitations.[2]

This set of rejected claims depend from two independent claims, namely claims 1 and 34.

For at least the reasons set forth above, amended independent claims 1 and 34, and their dependent claims 4 and 35, cannot be anticipated by Tatsumi. Accordingly, dependent claims 4 and 35 cannot be unpatentable over Tatsumi in view of Fink, as neither of these cited references teach or suggest all the claim limitations. For example, neither Tatsumi not Fink teach or suggest an multiple crystal growth environments or an array of crystal growth environments and a positioner.

In addition, the Examiner states that Fink discloses:

> a micro-diffractometer that comprises an optical imaging system (LS and KA) for aligning the x-ray with a micro-sized sample. It is further taught that aligning the x-ray with the sample is a difficult and time-consuming process that requires trial and error due to the invisibility of the x-rays (column 1 , lines 31 -37).
>
> It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide an optical imaging system with the apparatus, since a person would be motivated to align the x-ray with the crystal by optical means prior to irradiating in order to speed up the alignment process. (Emphasis added).

It should, however, be pointed out that the location of the sample in Fink is always known. The laser and camera in Fink are only used to focus the X-ray beam on the sample.

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[2] *See In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

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For example, Fink states that "by movement of the sample (P) with respect to this camera image, the true and correct zero point of the X-ray with respect to the surface of the sample to be examined may be determined without the need for experimental and unnecessary X-ray or examination runs being taken."[3] This is completely unlike the present invention claimed in claims 4 and 35, which requires an imaging system that detects the presence and location of crystals grown in the incubator. For this reason alone, the combination of Tatsumi and Fink cannot render claims 4 and 35 unpatentable, as neither of the prior art references (taken alone or in combination) teach or suggest all the claim limitations. Accordingly, it is respectfully submitted that claims 4 and 35 are in condition for allowance.

The Examiner further rejects claims 5-6, 32-33 and 36-38 under 35 U.S.C. 103(a) as being unpatentable over Tatsumi, as applied to claim 1 above, and further in view of Stettner et al. (U.S. Patent No. 5,629,524).

For at least the reasons set forth above, amended independent claims 1 and 34, and their dependent claims 5-6, 32-33 and 36-38, cannot be anticipated by Tatsumi. Accordingly, dependent claims 5-6, 32-33 and 36-38 cannot be unpatentable over Tatsumi in view of Stettner, as neither of these cited references teach or suggest all the claim limitations.

Moreover, dependent claims 33 and 38 require that the phosphor screen achieves at least 4 to 8 line-pairs per millimeter resolution. Stettner teaches no such range of resolution.

The Examiner further rejects claim 8, 9, 10, and 22 under 35 U.S.C. 103(a) as being unpatentable over Tatsumi as applied to claim 1 above, and further in view of Cullity, Dosho (U.S. Patent No. 6,285,736), Polichar el al. (U.S. Patent No. 6,205,199), and Arnowitz el al. (U.S. Patent No. 6,468,346).

For at least the reasons set forth above, amended independent claims 1, and its dependent claims 8-10 and 22 cannot be anticipated by Tatsumi. Accordingly, dependent claims 8-10 cannot be unpatentable over Tatsumi in view of Cullity, Dosho, Polichar, or Arnowitz, as none of these cited references teach or suggest all the claim limitations.

The Examiner further rejects claims 17 and 18 under 35 U.S.C. 103(a) as being unpatentable over Tatsumi as applied to claim 16 above. The Examiner states that:

> [i]t would have been obvious to a person of ordinary skill in the art at the time the invention was made to store the location of the crystalline material, since a person would be motivated to automate the alignment procedure by storing the location of the crystalline

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[3] *See* Fink Abstract.

> material in a computer and program the computer to calculate the positions of the x-ray source and x-ray detector based on the location of the crystalline material. (Emphasis added).

For at least the reasons set forth above, amended independent claim 11, and its dependent claims 17 and 18, cannot be anticipated by Tatsumi. Accordingly, dependent claims 17 and 18 cannot be unpatentable as neither Tatsumi nor knowledge generally available to one skilled in the art, teach or suggest all the claim limitations.

Furthermore, as the cited references do not teach aligning an X-ray source with crystalline material (see the argument with regard to Fink above), but rather teach a mechanism for focusing an X-ray on a sample, it could not have been obvious to automate the alignment procedure by storing the location of the crystalline material in a computer as set forth by the Examiner. It should be stressed that any teaching or suggestion to make the claimed combination must be found in the prior art and not based on applicant's disclosure.[4] Accordingly, it is respectfully submitted that claims 17 and 18 cannot be unpatentable over Tatsumi, as the cited references completely lack any teaching or suggestion of storing the location of any detected crystalline material for later alignment of the crystalline material with an X-ray beam.

The Examiner further rejects claim 21 under 35 U.S.C. 103(a) as being unpatentable over Tatsumi as applied to claim 20 above; The Examiner states that:

> [i]t would have been obvious to a person of ordinary skill in the art at the time the invention was made to perform this method in any growth environment, since a person would be motivated to monitor the growth of a crystalline material in order perfect the growth process.

For at least the reasons set forth above, amended independent claim 11, and its dependent claim 21, cannot be anticipated by Tatsumi. Accordingly, dependent claim 21 cannot be unpatentable, as neither Tatsumi or knowledge generally available to one skilled in the art teach or suggest all the claim limitations.

The Examiner further rejects claims 23 and 24 under 3 5 U. S.C. 103(a) as being unpatentable over Tatsumi as applied to claim 1 above.

For at least the reasons set forth above, amended independent claim 11, and its dependent claims 23 and 24, cannot be anticipated by Tatsumi. Accordingly, dependent

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[4] *See In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

claims 23 and 24 cannot be unpatentable, as neither Tatsumi or knowledge generally available to one skilled in the art teach or suggest all the claim limitations.

Moreover, Tatsumi teaches methods that require crystals used in semiconductors or optical devices, *e.g.*, silicon crystals, and not protein crystals or salt crystals. This is one of the major differences between Tatsumi and the present invention. The protein or salt crystals grown, detected, and analyzed by the present invention are used in structural or molecular biology, which is completely dissimilar to the growth and detection of silicon crystals. For example, protein crystals may be used to formulate new pharmaceuticals, while silicon crystals are typically used for semiconductors or optics (as described by Tatsumi). For this reason alone, claims 23 and 24 are patentable over the cited references.

The Examiner further rejects claims, 5-6, 8-10, 17, 18, 21, 22, 28-30, and 31 under 35 U.S.C. 103(a) as being unpatentable over Murayama (U.S. Patent No. 5,046,077) as applied to claim 1 above, and further in view of Fink, Stettner, Cullity, Dosho, Polichar, Arnowitz, or knowledge generally available to those skilled in the art.

Murayama discloses a method and apparatus for measuring lattice spacings in particular of a single crystal during the growth thereof by vapor deposition while located in a heating furnace. Such crystals grown by vapor deposition in heating furnaces are as in Tatsumi used in the semiconductor and optics fields and are completely different to the protein and salt crystals used by molecular and structural biologist, as per the present invention.

At the very least, Murayama does not disclose: multiple crystal growth environments and a positioner as required by independent claim 1; the multiple *in-situ* growth environments and alignment required by independent claim 11; or the array of crystal growth environments and the positioner required by independent claim 34. These limitations are also not disclosed, taught, or suggested by Fink, Stettner, Cullity, Dosho, Polichar, or Arnowitz. Consequently, these claims cannot be unpatentable over Murayama in view of Fink, Stettner, Cullity, Dosho, Polichar, or Arnowitz, as none of these references alone or in combination teach or suggest all of the claims limitations. Furthermore, many of these references do not teach or suggest many of the other limitations required by these rejected claims, as set forth above.

In light of the above and the amendments made to the independent claims, it is respectfully submitted that claims, 5-6, 8-10, 17, 18, 21, 22, 28-30, and 31 are now in condition for allowance.

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New Claims

The new claims 39-42 are directed to subject matter previously described, but not previously claimed. No new matter has been added.

CONCLUSION

In light of the above amendments and remarks, the Applicant respectfully requests that the Examiner reconsider this application with a view towards allowance. The Examiner is encouraged to call the undersigned attorney at (650) 849-7603, if a telephone call could help resolve any remaining items.

Respectfully submitted,

Date: _____

DRAFT

(Reg. No.)

Dion M. Bregman 45,645
for Laura A. Coruzzi 30,742
PENNIE & EDMONDS LLP
3300 Hillview Avenue
Palo Alto, California 94304
(650) 493-4935

CA1: 346920.2